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lower edge of the fillet is a tangent to the upper part of the curve; and in Fig. 8 the upper edge of the fillet is a tangent to the curve of the lower extremity. Suppose now that the arc R *q* is described to fancy; then, if it touch the lower edge R E of the fillet at R, and if R *b* be perpendicular to R E, the centre of the circle which will touch the line R E at R will be in the line R *b*; therefore, from a centre on the line R *b*, with any radius describe the arc. Draw P *c* perpendicular to D P. In P *c* cut off P *a* equal to the radius of the lesser circle, and join *a b*. Bisect *a b* by a perpendicular *f c*. Draw *c q* through the point of intersection *c* and the centre *b*. From *c* with the radius *c q* describe the arc *q* P, and this will complete the scotias.

(*To be continued.*)

The Sectorian System of Hand-Railing.

This plate shows a platform stairs on a level landing, with a six inch cylinder and three and a half inch rail.

Fig. 1. The plan showing the stretch out of rail as at a, inside and out. Through the centre of the rail, at the top and sides, are tangents which intersect at b, and are of the first importance in the development of this work, as all rails are worked from centres.

Fig. 2 is the tangent bevel, so called as the instrument used for obtaining the oblique bevel across the face of the sector, Fig. 4, when closed to a right angle or any other required.

Fig. 3 is the lower part of wreath; the form of which is obtained by first spreading the sector and getting the distance from b to c, Fig. 1, and applying it to the sector each way as shown; then raise perpendiculars from these points and draw a base line, starting at b, across to the left, and set up half riser at a; then from b through a, draw the line b, c, which will be the rake of the wreath. The lines from b down, and from c up, show the rake of the flyers. Now, having obtained this line, close the sector to a right angle, place pins on the line, and place the tangent bevel astride the hinge joint with the inner edge of each blade thin so as to lie close to the pins, and see the edge fits the line exactly, as much depends on accuracy at this point. Having obtained the bevel, and while in position on the sector, take the spring or small bevel and apply one blade to the face of the sector and the other to the tangent bevel at a right angle with the blade; this gives the spring and plumb lines for the concave and convex edges of the rail, and by removing the slabs as marked, the inner and outer twists are obtained for the application of the falling moulds, which gives the twist of the top and bottom faces and also the thickness of the rail.

Now remove the tangent bevel from the sector, and lay it flat on the board of which the mould is to be made, and mark from the inner edge of it each way to the chord line on one side and to the centre joint on the other. The distance is obtained by measuring on the raking line of sector from a and b to the centre. Then, from these points on Fig. 3, draw at right angle with the tangents, the chord line and centre joint until they intersect at a, which makes the point to describe the circle for the wreaths both concave and convex. The sections at the end of the wreath are so well defined, as also the application of the bevel, that further explanation is deemed unnecessary.

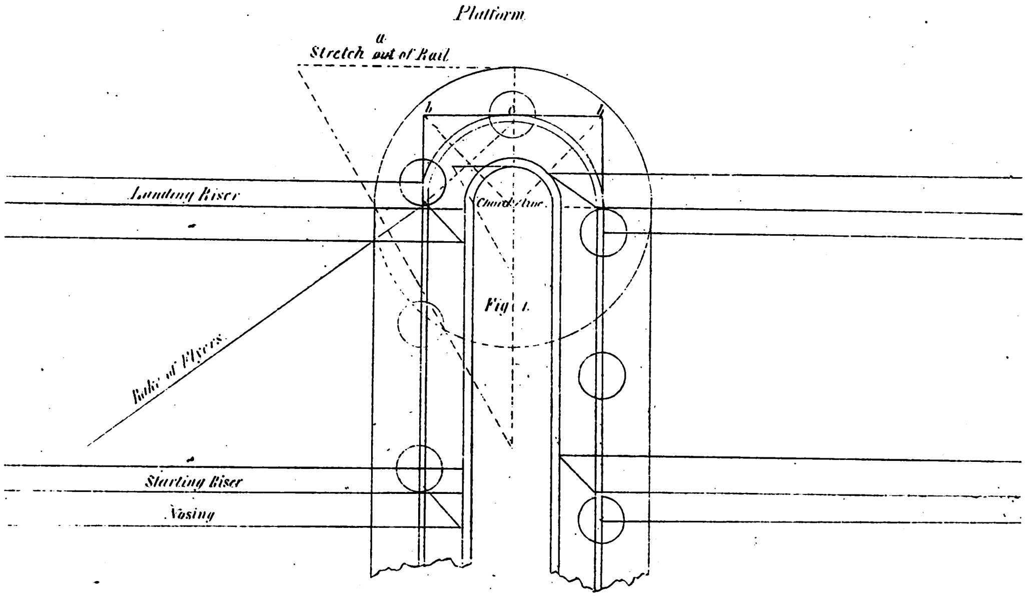
Figs. 5 and 6 are the moulds for the concave and convex surfaces of wreaths, and must be the width of the thickness of the same, and obtained as shown on the sector. Draw a line parallel with rake of wreath; then set off the thickness, and extend the line to the perpendicular on the right; then draw rake of flyers entended to d; then take distance of the stretch-out at Fig. 1 and extend across the sector at a right angle, and from the perpendicular line on the right to point n on the left, the curves between the rake of wreath and flyers give the ramp of rail which completes it.

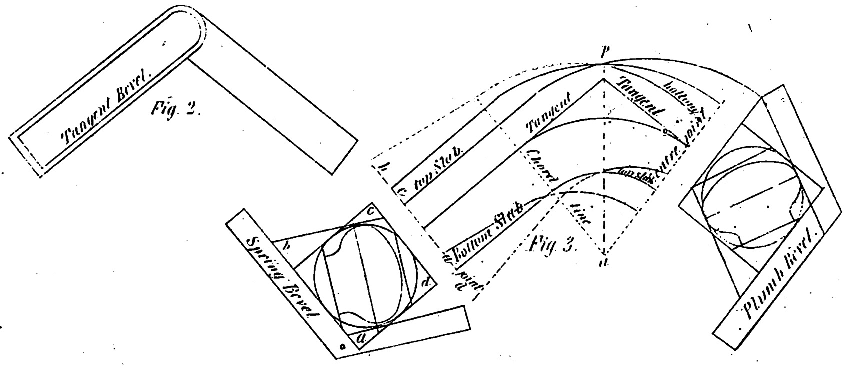
It is best to make the falling moulds of tin, and bend them to the twist as evenly as possible, and secure the ends. See that the concave mould is pressed firmly in its place, and well secured to the wreath. The centre perpendicular line should be drawn on the face of both moulds, giving the rake of the plank from the face. In applying the moulds see that the centre line corresponds with the centre of rail, and if the moulds are required to be raised or lowered, do not raise one end more than the other. When all is made secure, take a good hand or panel saw, and kerf in top and bottom till the saw touches the edge of the mould; then work off to the bottom of kerf, and the thickness and twist of wreath are obtained. All joints are made by squaring from tangents and from the face of the plank, which should be out of wind or twist when the mould is taken. It is seen why I advise tin for the falling moulds—good stiff pasteboard would answer with a every careful person. The tin could not injure the saw much, but the saw might injure the rail by disregarding the pasteboard edge.

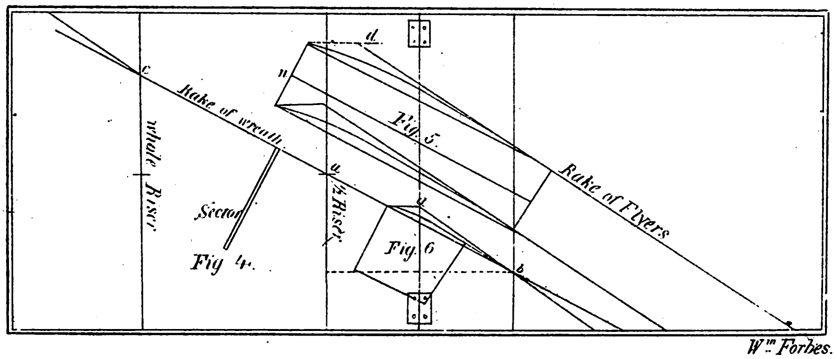
If this explanation is not sufficiently explicit, what is lacking must be gathered from other portions of the work.

The application of the face-mould on the wreath-piece, as indicated by lines and letters a, a, b, b, c, c, and d, d, will show the slabs to be taken off. By reversing the face-mould it will answer for both pieces of wreath.

PLATE 10.







Scale

Wm Forbes. Archt

THE SECTORIAN SYSTEM OF HAND-RAILING.